AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (Original) A method of etching a substrate (16) by an inductively-coupled plasma (24), in which the substrate (16) is placed in a reaction chamber (1), an atmosphere of an appropriate gas is established in the reaction chamber (1) at a suitable operating pressure, the substrate (16) is biased, and the gas in the reaction chamber (1) is excited by a radiofrequency excitation electromagnetic wave passing through a leakproof wall (5) of dielectric material in order to generate a plasma (24), which method is characterized in that it includes a prior step of establishing the power of the plasma excitation electromagnetic wave progressively, during which step a gas that is inert for the substrate is injected into the reaction chamber (1) and the power of the plasma excitation electromagnetic wave is raised progressively until the appropriate nominal power is reached, thereby forming an inert gas plasma (24) which progressively heats up the leakproof wall (5) of dielectric material, after which active gas is injected into the reaction chamber (1) in order to replace the inert gas and undertake active steps of etching by means of the plasma (24) of active gas.

2. (Original) A method according to claim 1, characterized in that the progressive increase in the plasma excitation power is programmed so as to ensure that the thermal shock applied to the leakproof wall (5) of dielectric material by the inert gas plasma (24) remains below a wall-destroying threshold.

3. (Currently Amended) A method according got claim 1 ~~or claim 2~~, characterized in that the prior step of progressively establishing the plasma excitation power is undertaken solely at the beginning of reaction chamber operation after a period of inactivity, and is followed by alternating active etching steps (BC; CD) during which the temperature of the leakproof wall (5) of dielectric material remains in a range of values that is sufficiently narrow to avoid any destructive thermal shock being applied to the leakproof wall (5) of dielectric material.

4. (Currently Amended) A method according to ~~any one of claims 1 to 3~~claim 1, characterized in that the active etching steps comprise a succession of etching steps (BC) using a fluorine-containing gas such as SF_6, and passivation steps (CD) using a of etching passivation gas such as C_xF_y.

5. (Original) Apparatus for etching substrates (16) by an inductively-coupled plasma, the apparatus implementing a method according to any one of claims 1 to 4, and comprising a reaction chamber (1) surrounded by a leakproof wall (2), the reaction chamber (1) having substrate support means (3) and being in communication with an inductively-coupled plasma source (4) having a leakproof wall (5) of dielectric material and an inductive coupling antenna (6) powered by a radiofrequency generator (7), the reaction chamber (1) being connected via a vacuum line (8) to pump means (9) for establishing and maintaining an appropriate vacuum inside the reaction chamber (1), the reaction chamber (1) being connected via an inlet line (10) to a process gas source (11), the apparatus being characterized in that:

· the process gas source (11) comprises an inert gas source (11a), at least one active gas source (11b, 11c), and distribution means (12a, 12b, 12c) controlled by control means (13) to introduce the appropriate gas into the reaction chamber (1);

· the radiofrequency generator (7) has means for adjusting its radiofrequency power under the control of the control means (13); and

· the control means (13) include a control program (13a) with a prior sequence of establishing power, during which:

a) the control means (13) control the distribution means (12a, 12b, 12c) to introduce an inert gas into the reaction chamber (1);

b) the control means (13) cause the radiofrequency power control means of the radiofrequency generator (7) to produce radiofrequency energy that increases progressively until reaching the nominal power (PN); and

c) thereafter the control means (13) control the distribution means (12a, 12b, 12c) to replace the neutral gas in the reaction chamber (1) with an active gas.

6. (Original) Apparatus according to claim 5, characterized in that the distribution means (12a, 12b, 12c) comprise solenoid valves each connected in series between a respective corresponding gas source outlet (11a, 11b, 1c) and an inlet (14) to the plasma source (4).

7. (Currently Amended) Apparatus according to claim 5 ~~or claim 6~~, characterized in that it includes a source (11a) of inert gas such as nitrogen (N_2) or argon, a source (11b) of an etching gas such as SF_6, and a source (11c) of a passivation gas such as C_4F_8.

8. (Currently Amended) Apparatus according to ~~any one of claims 5 to 7~~claim 5, characterized in that the leakproof wall (5) of dielectric material of the plasma source (4) is made of alumina Al_2O_3.

9. (Currently Amended) Apparatus according to ~~any one of claims 5 to 8~~claim 5, characterized in that the leakproof wall (5) of dielectric material of the plasma source (4) is of tubular shape, and the inductive coupling antenna (6) is a coaxial turn placed around the tubular wall.

10. (Currently Amended) Apparatus according to ~~any one of claims 5 to 9~~claim 5, characterized in that the leakproof wall (2) of the reaction chamber (1) has a peripheral portion (2a) connected to an inlet front portion (2b) that is itself open to communicate with an inlet tube constituting the plasma source (4), the inlet front portion (2b) being connected to the leakproof wall (5) of dielectric material by means of a sealing gasket (2c), together with cooling means (2d) for cooling the inlet front portion (2b) and the sealing gasket (2c).